

control valve type BR 11

strong
arguments
of modern technology



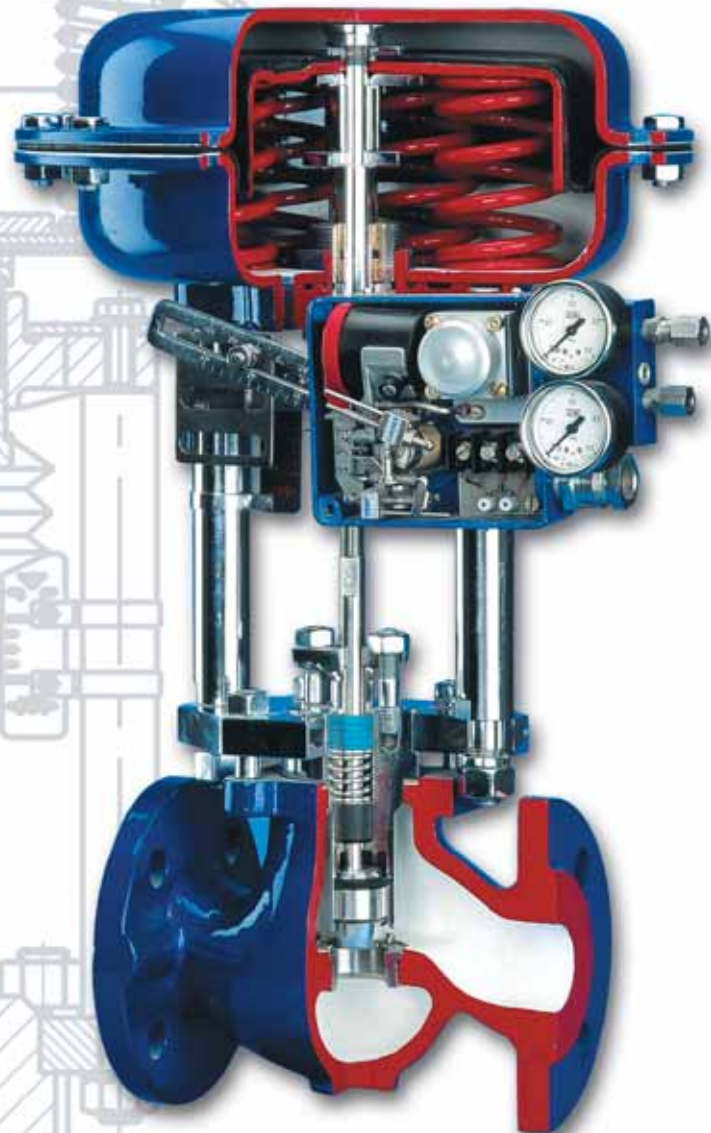
Single ported globe control valve

Function

The valves are used as control elements in automatic control and remote control systems. They are designed to control the intensity of flow of liquids and gases; they have developed series of types of „Z“ valves. Their design reflects the latest trends in world technology. They are produced on machine tools of high working capacity and accuracy of operation, in compliance with the requirements of the Quality Assuring System ISO 9001.

These products have met with customers recognition and approval, which resulted in dynamic rise of sales to domestic and foreign markets.

Thanks to a wide material range and various design versions, the valves find their application in different branches of industry, such as: chemical industry, heat engineering and power industry, paper, food industry, metal producing industry, mining etc.



Characteristic

- a wide range of flow coefficients and control characteristics
- high shut-off tightness for lightened and non-lightened valve plugs, within the full range of flows and characteristic, afforded by valve plug seat with gasket
- metal or soft metal - seal version with identical KvS
- low over-control forces as a result of application of lightened valve plugs in valves with DN 40 ... 250
- asbestos-free sealing of a high class: Flat or bellows seal
- multi-spring pneumatic actuators type P/R of fully reversible action with possibility of changing the range of springs without additional parts; with direct actuator - P - air-to-close action can be attained and with reverse actuator - R - air-to-open action
- pneumatic, electric, electrohydraulic acutation
- small masses and overall dimensions; favourable price
- ingenious patent
- long life and dependable service afforded by special surface treatment (burnishing, nitriding, stellite)
- control range 50:1

Construction and technical specification

The valve fitted with pneumatic actuator is composed of the following main parts:

Body (sec to Fig. 1)

Single-ported, cast, flanged

Nominal diameter

DN 15; 20; 25; 32; 40; 50; 65; 80; 100; 150; 200; 250

Nominal pressure

PN 10; 16; 25; 40 or ANSI 150; 300 lbs

Connection

Flange face DIN EN 1092-1

Flange face ANSI B 16.5 (RF, RTJ)

Housing length

As per DIN or ANSI B 16.10

Housing length

Ductile iron (EN-JS1020 / EN-GJS-400-18)

Carbon steel (1.0619 / GP240GH)

Acid proof steel (1.4408 / GX5CrNiMo19-11-2)

Working pressure and temperature, materials and nominal pressure - sec. to Fig. 3

Bonnet

Made in four varieties (sec. to Fig. 2)

Standard

For fluid temperature $-40^{\circ} \dots +350^{\circ} \text{C}$

Extension

For fluid temperature $-198^{\circ} \dots +560^{\circ} \text{C}$

Bellow seal

For fluid temperature $-100^{\circ} \dots +400^{\circ} \text{C}$

TA-Luft packing

For fluid temperature $-40^{\circ} \dots +200^{\circ} \text{C}$

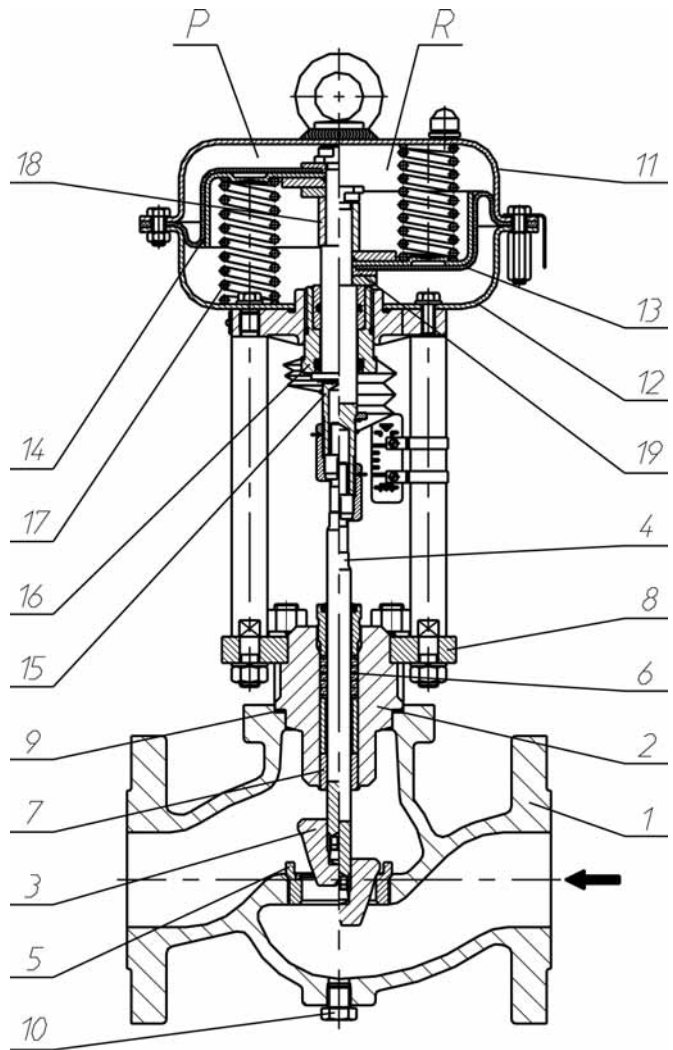
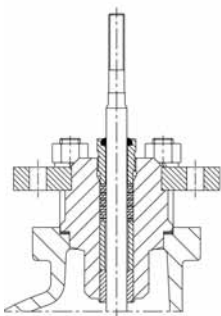
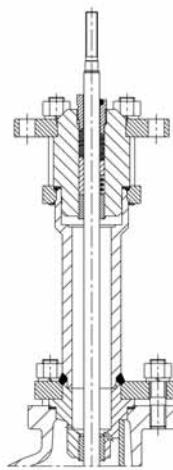


Fig. 1
Valve construction

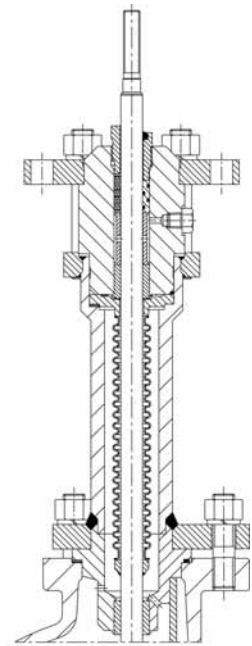
Fig. 2
Bonnet types



Standard



Extension



Bellows seal

Material designation

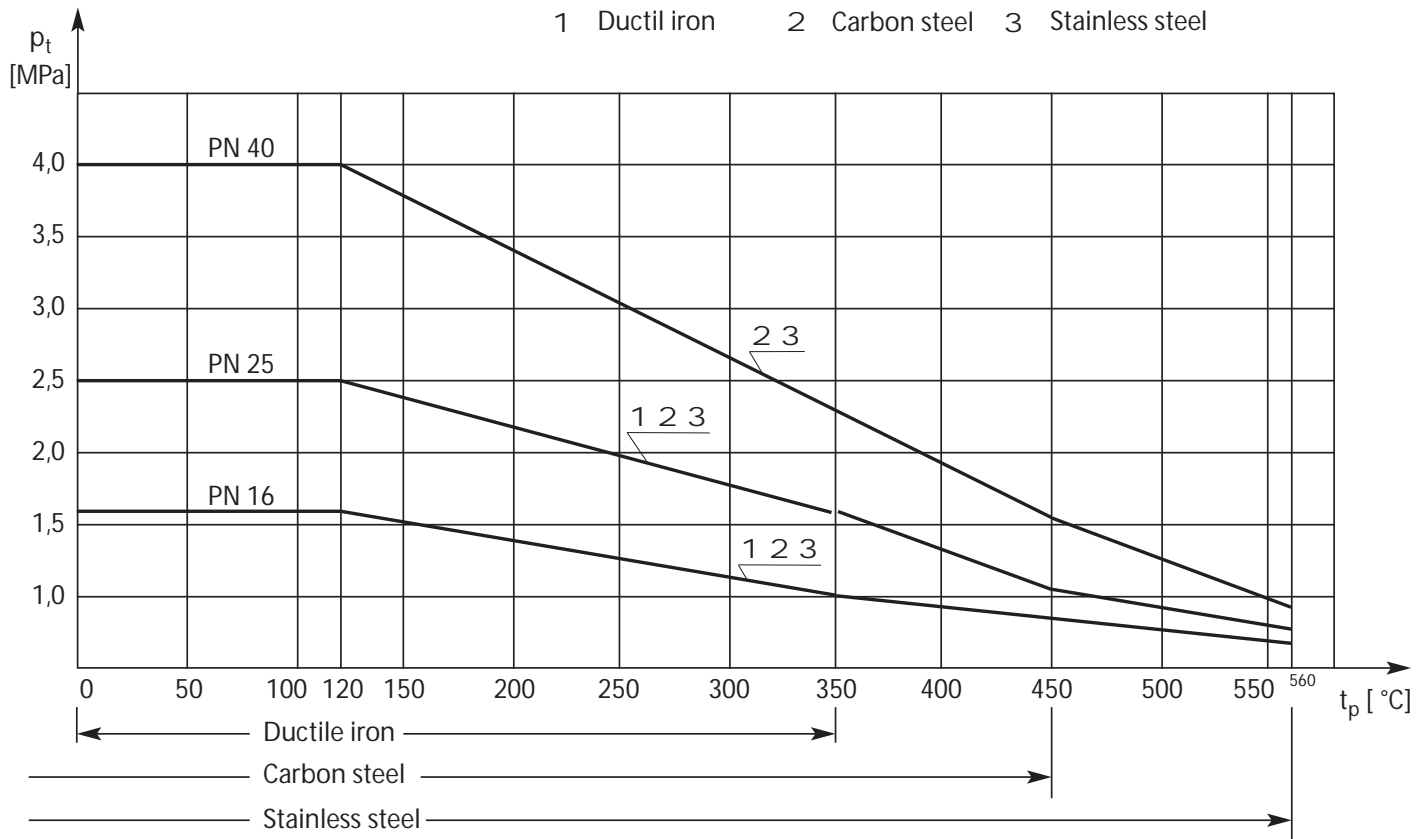


Fig. 3

Body material, nominal pressure, working pressure and temperature

Valve plug (3), valve seat (5)

of acidproof steel.

In case of strongly abrasive medium being used and appearance of cavitation or pressure drops, high temperatures and flow velocity, the faying faces of plugs and seats or their whole profiles are stellite or plasma nitrided.

Types of valve plugs in use

- non-lightened (standard)
- lightened

Type of flow characteristic

- equal percentage (P)
- linear - (L)
- quick - opening for on/off action (O)

Type of valve seats in use

- metal seal
- soft (PTFE or silicone rubber packing)

Shut of tightness

- below 0,01 % Kvs - (Class IV, as per IEC 534/4) for metal seal
- bubble tight (Class VI, as per IEC 534/4) for soft seal

Direction of fluid flow

under the valve plug

Note

1. Flow coefficients Kvs - acc. to Tab. 1 and Tab. 2
2. Equal percentage flow characteristic acc. to Fig. 4
3. The valve plug types, characteristic, flow coefficients Kvs are the same for metal and soft seal versions
4. In valves with quick-opening characteristic (O) Kvs coefficients are greater by 20% than those given in Tab. 1 and Tab. 2

Flow coefficients Kv_S (m³/h) for unbalanced valve plugs

Tab. 1

Kv_S (m ³ /h)	Stroke (mm)	Plug face (mm)	Valve nominal size DN												Characteristic			
			15	20	25	32	40	50	65	80	100	150	200	250	L	P	S	
0,010	20	6,35																
0,016																		
0,025																		
0,040																		
0,063																		
0,10																		
0,16																		
0,25																		
0,40																		
0,63																		
1,0																		
1,6				9,52														
2,5				12,70														
4,0				19,05														
6,3				20,64														
10				25,25														
16				31,72														
25				41,25														
40	38	50,80																
63		66,70																
94		88,90																
160		107,92																
250	50	126,95																
320		158,72																
500	63	195,00																
630																		

Translation: Kv -value to Cv -value = $Kv \times 1,16$

Flow coefficients Kv_S (m³/h) for pressure balanced valve plugs

Tab. 2

Kv_S (m ³ /h)	Stroke (mm)	Valve nominal size DN							Characteristic			
		40	50	65	80	100	150	200	250	L	P	S
25	20											
40												
63												
94	38											
125												
160												
250	50											
320												
500	63											
630												

Equal percentage flow characteristic

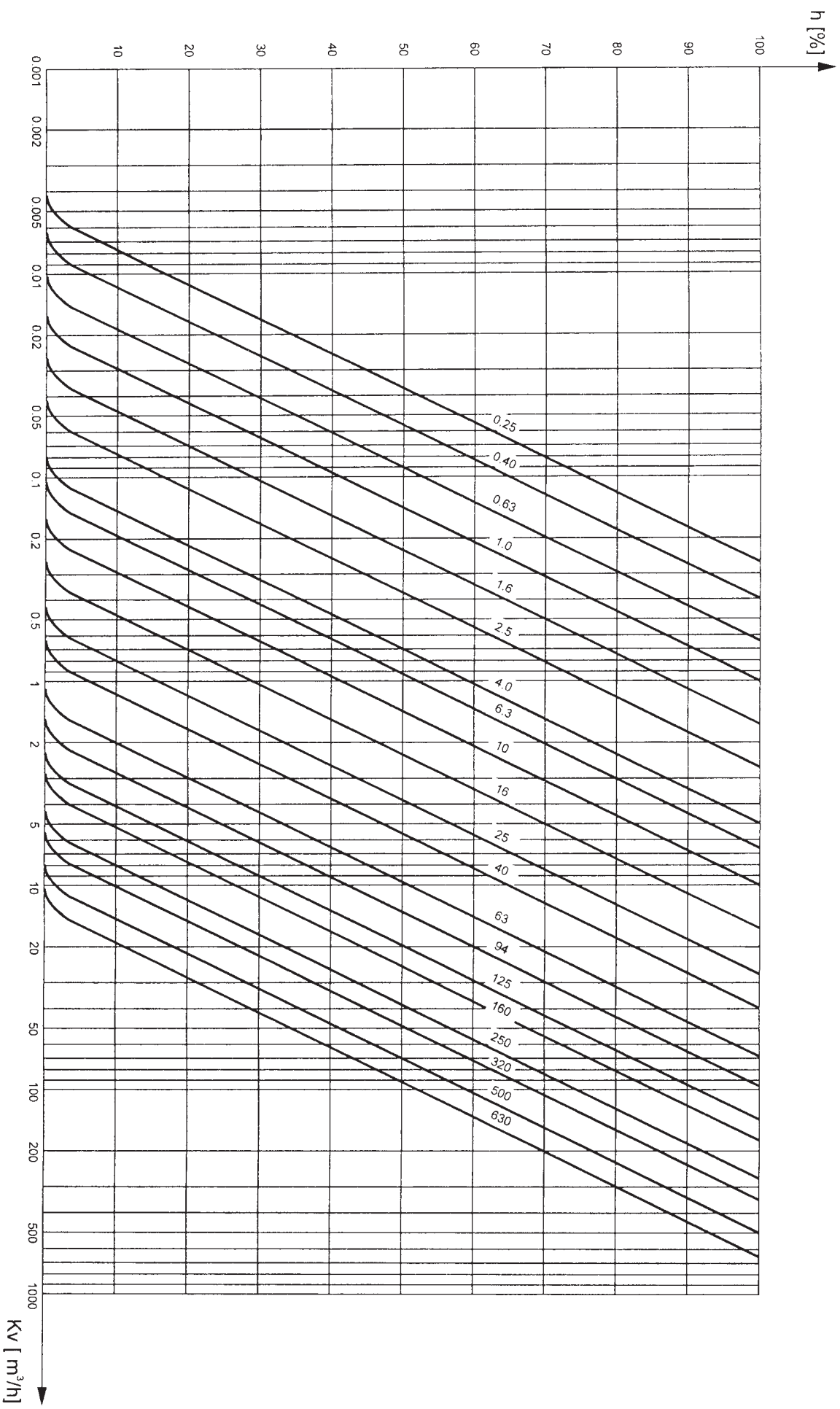


Fig. 4
Control valves $K_{vs} = 0,25 \dots 630 \text{ m}^3/\text{h}$

Valve plug stem (4)

Of acid proof steel outside surface burnished, enables to plug to be rigidly connected to the actuator stem, allows for effective cooperation with packing

Valve stem packing box (6)

Consist of ring seals made of:

- a high quality packing cord (PTFE, graphite)
- expanded graphite band or „V“ rings of PTFE

Tab. 3: Valve stem packing and application range

Packing	Temperature [°C]		
	Bonnet		
	Standard	Extension	Bellows seal
PTFE - „V“-type	-46 ... 200	-198 ... -46 200 ... 300	-100 ... 200
PTFE + graphite			
PTFE - „V“-type / „TA-Luft“			
Graphite	200 ... 300	300 ... 450	200 ... 400
Graphite / „TA-Luft“			

Guiding sleeve (7)

Of stainless steel, ion nitrided for resistance to fretting

Connection plate (8)

Connects the valve with pneumatic actuator, electric actuator, electrohydraulic actuator or manual operating mechanism type NN.

It is made of carbon steel or stainless steel depending on the body material

Body gasket (9)

Of asbestos-free cardboard or sealant in acidproof casing, depending on operation conditions

Drain plug (10)

Of steel or stainless steel designed for a periodical cleaning of the valve body interior-optional

Cases (11) and (12)

Of sheet, form the pressure chamber

Diaphragm (13)

With permanent effective surface, provides linear dependence of the valve stem displacement on the actuator control pressure, made of neoprene with polyester fabric

Diaphragm plate (14)

Drawn of steel with spring seats

Actuator stem (15)

Of toughened stainless steel; connects the diaphragm unit to the valve

Actuator packing box (16)

Designed to seal and guide the valve stem, enables the spring tension to be pre-set

Springs (17)

Of constructional spring steel 3, 6 or 12 springs are used depending on the required range

Sleeve (18) and spacer pieces (19)

Designed to change the pneumatic actuator action from direct to reverse and to change the spring range

Tab. 4: Operating parameters for special design valves

Valve designe	Working temperature [°C]		Maximum working temperature [MPa]
	Minimum	Maximum	
with pressure balanced plug	-50	250	4,0
with soft seal	PTFE	260	3,5
	silicon rubber	220	3,5
with bellows seal bonnet	-100	400	3,5

Allowable pressure drop Δp [MPa] - acc. to tab. 5, 6 and 7

Note:

Allowable pressure drops Δp (MPa) specified in a/m tables concern the closed valve. Actual pressure drops should not exceed 70 % of the admissible working pressure.

Tab. 5: Allowable pressure drop Δp [MPa] for valves with unbalanced plugs, metal seal and pneumatic actuators

Flow coefficient Kvs [m ³ /h]	Nominal valve size DN	Stroke mm	Air-to-close					Air-to-open		
			Actuator		Δp [MPa]			Actuator		Δp [MPa]
			Size	Spring range [kPa]	Supply pressure [kPa]			Size	Spring range [kPa]	
					140	250	400			
to 4	15; 20; 25; 32; 40; 50	20	250	20 - 100	4,0	-	-	250 250	20 - 100 40 - 200	2,3 4,0
6,3	20; 25; 32; 40; 50	20	250	20 - 100	2,4	4,0	-	250 250 250	20 - 100 40 - 200 60 - 140	0,7 2,4 4,0
10	25; 32; 40; 50	20	250	20 - 100	2,0	4,0	-	250 250 250 250	20 - 100 40 - 200 60 - 140 80 - 240	0,5 2,0 3,0 4,0
16	32; 40; 50	20	250	20 - 100	1,2	4,0	-	250 250 250 250 250	20 - 100 40 - 200 60 - 140 80 - 240 120 - 280	0,2 1,2 2,2 3,2 4,0
	65	20	400	20 - 100	2,4	4,0	-	400 400 400	20 - 100 40 - 200 60 - 140	0,8 2,4 4,0
25	40; 50; 65; 80	20	400	20 - 100	1,4	4,0	-	400 400 400 400 400	20 - 100 40 - 200 60 - 140 80 - 240 120 - 280	0,4 1,4 2,4 3,4 4,0
40	50; 65; 80; 100	20	400	20 - 100	0,65	3,8	4,0	400 400 400 400	40 - 200 60 - 140 80 - 240 120 - 280	0,6 1,2 1,8 2,9
63	65; 80; 100	38	630	20 - 100	0,85	4,0	-	630 630 630 630 630	40 - 200 60 - 140 80 - 240 120 - 280 180 - 380	0,9 1,5 2,1 3,4 4,0
	150	38	1000	20 - 100	1,6	4,0	-	1000 1000 1000	40 - 200 80 - 240 120 - 280	1,6 3,6 4,0
94	80; 100	38	630	20 - 100	0,4	2,4	4,0	630 630 630 630 630	40 - 200 60 - 140 80 - 240 120 - 280 180 - 380	0,4 0,8 1,1 1,8 2,9
	150; 200	38	1000	20 - 100	0,8	3,2	4,0	1000 1000 1000 1000	40 - 200 80 - 240 120 - 280 180 - 380	0,8 2,0 3,1 4,0
125; 160	100	38	630	20 - 100	0,2	1,3	2,8	630 630 630 630 630	40 - 200 60 - 140 80 - 240 120 - 280 180 - 380	0,2 0,4 0,6 1,0 1,6
	150; 200; 250	38	1000	20 - 100	0,4	2,2	4,0	1000 1000 1000 1000	40 - 200 80 - 240 120 - 280 180 - 380	0,4 1,0 1,7 2,6
250	150; 200; 250	50	1000	20 - 100	0,25	1,4	3,0	1000 1000 1000 1000	40 - 200 80 - 240 120 - 280 180 - 380	0,25 0,65 1,1 1,75
320	150; 200; 250	50	1000	20 - 100	0,15	1,0	2,2	1000 1000 1000 1000	40 - 200 80 - 240 120 - 280 180 - 380	0,15 0,45 0,8 1,25
500	200; 250	63	1000	20 - 100	-	0,6	1,4	1000 1000 1000 1000	40 - 200 80 - 240 120 - 280 180 - 380	- 0,25 0,5 0,75
630	250	63	1000	20 - 100	-	0,4	0,9	1000 1000 1000 1000	40 - 200 80 - 240 120 - 280 180 - 380	- 0,15 0,3 0,5

Note:

- In valves, mode of operation being „air-to-open“ the actuator with spring range 40-200 [kPa] can be replaced by an actuator with spring range 40-120 [kPa] at the same pressure drops.
- The actuators for valves with lightened plugs and hard seal for the pressure drop down to the value $\Delta p=4,0$ [MPa] should be selected in a following way:
 - valve mode of operation „air-to-close“ - spring range 20 - 100 [kPa], supply pressure 140 [kPa]
 - valve mode of operation „air-to-open“ - spring range 40 - 120 [kPa] or 40 - 200 [kPa]



Tab. 6: Allowable pressure drop Δp [MPa] for valves with unbalanced plugs, soft seal and pneumatic actuators

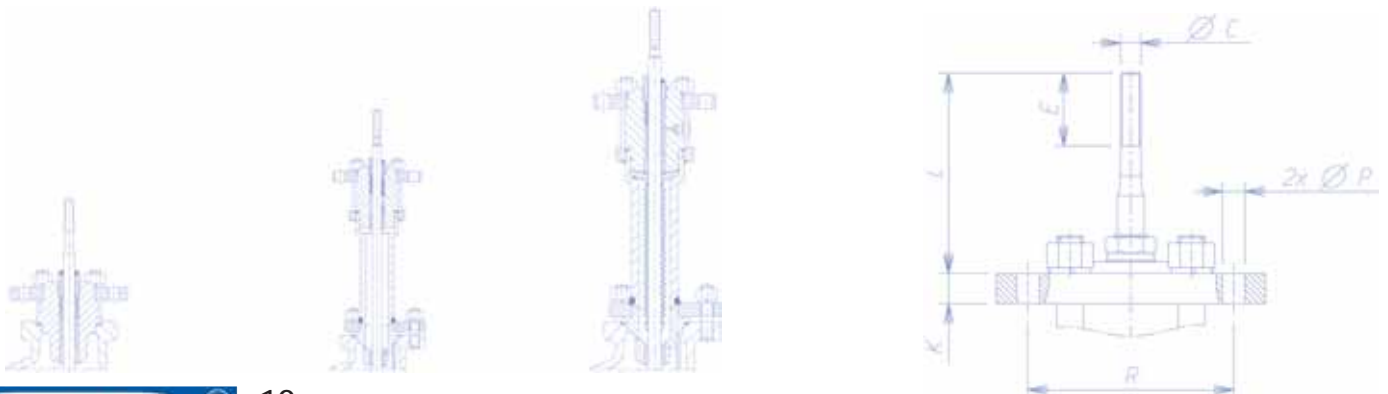
Flow coefficient Kvs [m ³ /h]	Nominal valve size DN	Stroke mm	Air-to-close					Air-to-open		
			Actuator		Δp [MPa]			Actuator		Δp [MPa]
			Size	Spring range [kPa]	Supply pressure [kPa]			Size	Spring range [kPa]	
					140	250	400			
to 4	15; 20; 25; 32; 40; 50	20	250	20 - 100	3,5	-	-	250 250	20 - 100 40 - 200	1,5 3,5
6,3	20; 25; 32; 40; 50	20	250	20 - 100	1,7	3,5	-	250 250	40 - 200 60 - 140	1,7 3,5
10	25; 32; 40; 50	20	250	20 - 100	1,2	3,5	-	250 250 250	40 - 200 60 - 140 80 - 240	1,2 2,6 3,5
16	32; 40; 50	20	250	20 - 100	0,6	3,5	-	250 250 250 250	40 - 200 60 - 140 80 - 240 120 - 280	0,6 1,6 2,6 3,5
	65	20	400	20 - 100	1,8	3,5	-	400 400 400	40 - 200 60 - 140 80 - 240	1,8 3,4 3,5
25	40; 50; 65; 80	20	400	20 - 100	1,0	3,5	-	400 400 400 400	40 - 200 60 - 140 80 - 240 120 - 280	1,0 2,0 3,0 3,5
40	50; 65; 80; 100	20	400	20 - 100	0,35	3,5	-	400 400 400 400	40 - 200 60 - 140 80 - 240 120 - 280	0,35 0,9 1,5 2,6
63	65; 80; 100	38	630	20 - 100	0,6	3,5	-	630 630 630 630 630	40 - 200 60 - 140 80 - 240 120 - 280 180 - 380	0,6 1,2 1,9 3,1 3,5
	150	38	1000	20 - 100	1,3	3,5	-	1000 1000 1000	40 - 200 80 - 240 120 - 280	1,3 3,3 3,5
94	80; 100	38	630	20 - 100	0,3	2,3	3,5	630 630 630 630 630	40 - 200 60 - 140 80 - 240 120 - 280 180 - 380	0,3 0,7 1,0 1,8 2,8
	150; 200	38	1000	20 - 100	0,7	3,5	-	1000 1000 1000 1000	40 - 200 80 - 240 120 - 280 180 - 380	0,7 1,9 3,0 3,5
125; 160	100	38	630	20 - 100	-	1,1	2,6	630 630 630 630 630	40 - 200 60 - 140 80 - 240 120 - 280 180 - 380	- 0,2 0,4 0,8 1,4
	150; 200; 250	38	1000	20 - 100	0,25	2,0	3,5	1000 1000 1000 1000	40 - 200 80 - 240 120 - 280 180 - 380	0,2 0,9 1,5 2,5
250	150; 200; 250	50	1000	20 - 100	0,12	1,3	2,9	1000 1000 1000 1000	40 - 200 80 - 240 120 - 280 180 - 380	0,1 0,5 1,0 1,6
320	150; 200; 250	50	1000	20 - 100	-	0,9	2,1	1000 1000 1000 1000	40 - 200 80 - 240 120 - 280 180 - 380	- 0,35 0,65 1,15
500	200; 250	63	1000	20 - 100	-	0,5	0,8	1000 1000 1000 1000	40 - 200 80 - 240 120 - 280 180 - 380	- 0,2 0,4 0,7
630	250	63	1000	20 - 100	-	0,3	0,8	1000 1000 1000 1000	40 - 200 80 - 240 120 - 280 180 - 380	- 0,1 0,2 0,4

Note:

- In valves, mode of operation being „air-to-open“ the actuator with spring range 40-200 [kPa] can be replaced by an actuator with spring range 40-120 [kPa] at the same pressure drops.
- The actuators for valves with lightened plugs and hard seal for the pressure drop down to the value $\Delta p=3,5$ [MPa] should be selected in a following way:
 - valve mode of operation „air-to-close“ - spring range 20 - 100 [kPa], supply pressure 140 [kPa]
 - valve mode of operation „air-to-open“ - spring range 40 - 120 [kPa] or 40 - 200 [kPa]

Tab. 7: Allowable pressure drop Δp (MPa) for valves with electric actuators - metal seal and soft seal

Flow coefficient Kvs [m³/h]	Nominal valve size DN	Stroke mm	Actuator force [kN]																		
			unbalanced plug												balanced plug						
			0,5	0,6	0,8	1,8	2,0	3,2	4,0	6,3	10	12	16	20	25	4,0	10				
to 4	15; 20; 25; 32; 40; 50	20	2,3	3,0	4,0	4,0	4,0														
			1,8	2,3	3,5	3,5	3,5														
6,3	20; 25; 32; 40; 50	20	0,7	1,0	1,7	4,0	4,0														
				0,3	1,0	3,5	3,5														
10	25; 32; 40; 50	20	0,6	0,9	1,5	4,0	4,0														
					0,6	3,5	3,5														
16	32; 40; 50	20		0,4	0,8	2,8	4,0	4,0													
					0,2	2,2	2,6	3,5													
	65	20				2,8	4,0	4,0													
						2,2	2,6	3,5													
25	40; 50	20			0,4	1,6	1,9	3,4	4,0							4,0					
						1,2	1,5	3,0	3,5							3,5					
	65; 80	20				1,6	1,9	3,4	4,0							4,0					
						1,2	1,5	3,0	3,5							3,5					
40	50; 65; 80; 100	20				0,8	0,9	1,8	2,3	4,0						4,0					
						0,5	0,6	1,5	2,0	3,5						3,5					
63	65; 80; 100	38				0,5	0,6	1,2	1,6	2,7	4,0					4,0					
						0,2	0,3	0,9	1,3	2,5	3,5					3,5					
	150	38									4,0						4,0				
												3,5						3,5			
94	80; 100	38				0,2	0,25	0,6	0,8	1,5	2,5					4,0					
						0,1	0,15	0,5	0,7	1,4	2,4					3,5					
	150; 200	38									2,5	3,1	4,0				4,0				
												2,4	3,0	3,5				3,5			
125; 160	100	38							0,3	0,4	0,8	1,4					4,0				
									0,1	0,25	0,6	1,2					3,5				
	150; 200; 250	38										1,4	1,7	2,3	3,0	3,8	4,0				
													1,2	1,5	2,2	2,8	3,5	3,5			
250	150; 200; 250	50										0,9	1,1	1,5	2,0	2,5	4,0				
													0,7	1,0	1,4	1,8	2,4	3,5			
320	150; 200; 250	50											0,6	0,8	1,1	1,4	1,8	4,0			
														0,5	0,7	1,0	1,3	1,7	3,5		
500	200; 250	63												0,4	0,5	0,7	0,9	1,1	4,0		
																0,3	0,4	0,6	0,8	1,0	3,5
630	250	63														0,2	0,3	0,4	0,55	0,7	4,0
																	0,15	0,2	0,35	0,5	0,65



Valve actuator

The following type of actuators are in use:

1. Pneumatic - Diaphragm multi-spring actuators type P/R, without handwheel or with upper handwheel type P/R-N as per tab. 8

Tab. 8: Pneumatic actuator types

Size	Diaphragm effective area [cm ²]	Stroke mm	Turns for rated stroke (applies to P/R)
250	250	20	5
400	400	20	5
630	630	38	9
1000	1000	38, 50, 63	8, 10, 13

Control air connexion G 1/4"

Air pipes diameter

6 x 1 mm; 8 x 1 mm and other options

Spring ranges

20 ... 100 kPa; 40 ... 120 kPa = 3 springs

40 ... 200 kPa; 80 ... 240 kPa; 120 ... 280 kPa = 6 springs

180 ... 380 kPa = 12 springs

Max. supply pressure 600 kPa

Actuator ambient temperature range

-40° C ... +80° C

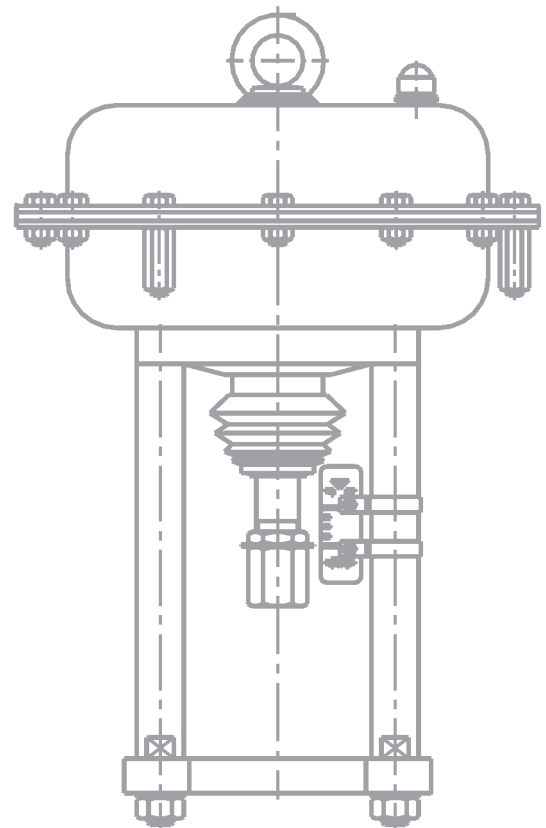
Accessories (optional)

- upper handwheel
- pneumatic positioner
- electopneumatic positioner
- air filter regulator
- three-way solenoid valve
- cut-off unit
- limit switches

2. Electric or electrohydraulic actuators

Detailed information and technical data concerning these actuators may be provided upon request

3. Manual operating mechanism type NN - acc. to tab. 9



Pneumatic actuator type P/R

Tab. 9: Kinds of manual operating mechanisms type NN

Size	Diaphragm effective area [cm ²]	Turns for rated stroke
250	250	5
400	400	5
630	630	9
1000	1000	8, 10, 13

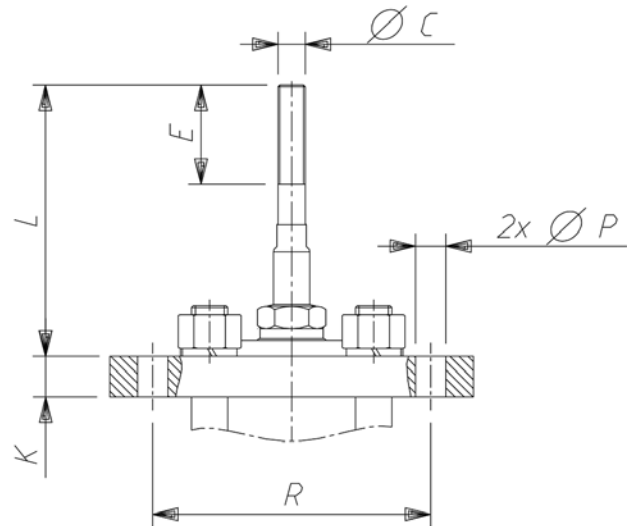
Mass, external and connection dimensions of valves

Tab. 10: Linkages [mm]

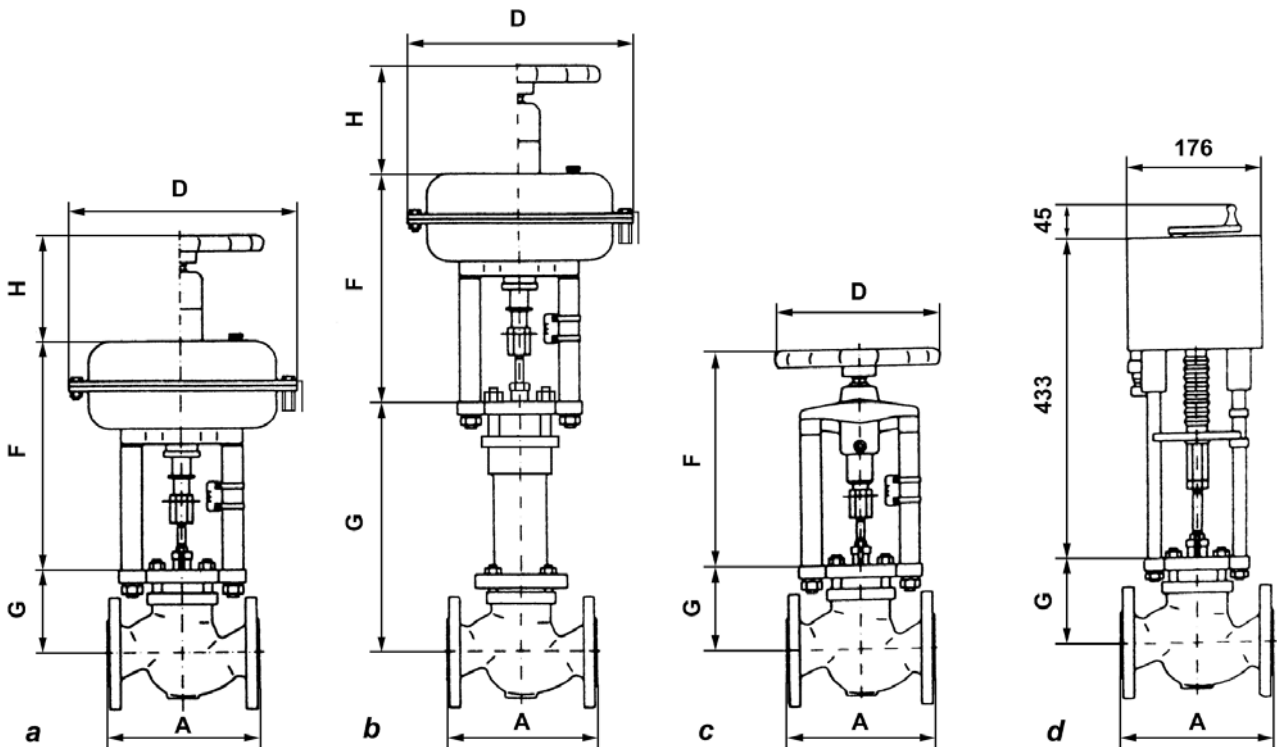
DN	ØC	E	L	ØP	R	K
15; 20; 25	M12x1,25	44	111	12,5	110	14
32; 40; 50		44	102	12,5 16,5 20,5	110 132 160	16
65; 80; 100		50	104	16,5 20,5	132 160	18
150; 200; 250	M16x1,5	80	162	20,5	160	20
			118	24,5	216	

Note:

1. Dimension R und ϕP may be changed upon request
2. Dimension L - given for closed valve
3. Dimension L = 118 for electric actuators



Total dimensions of valves



with standard bonnet and pneumatic actuator

with extension or bellows type bonnet and pneumatic actuator

with manual operating mechanism type NN electric

with ESL-03 actuator (example)

Tab. 11: Dimensions of valves with operating mechanisms [mm]

DN	G		F								D								H
	Standard bonnet	Extension and bellows seal	P/R 250	P/R 400	P/R 630	P/R 1000	N/N 250	N/N 400	N/N 630	N/N 1000	P/R 250	P/R 400	P/R 630	P/R 1000	N/N 250	N/N 400	N/N 630	N/N 1000	
15	107	241	306	-	-	-	290	-	-	-	240	-	-	-	225	-	-	-	150
20	107	241	306	-	-	-	290	-	-	-	240	-	-	-	225	-	-	-	150
25	107	241	306	-	-	-	290	-	-	-	240	-	-	-	225	-	-	-	150
32	114	243	306	-	-	-	290	-	-	-	240	-	-	-	225	-	-	-	150
40	118	253	306	312	-	-	290	290	-	-	240	305	-	-	225	225	-	-	150
50	122	257	306	312	-	-	290	290	-	-	240	305	-	-	225	225	-	-	150
65	166	410	-	312	402	-	-	290	308	-	-	305	375	-	-	225	305	-	150
80	166	410	-	312	402	-	-	290	308	-	-	305	375	-	-	225	305	-	150
100	173	417	-	312	402	-	-	290	308	-	-	305	375	-	-	225	305	-	150
150	305	510	-	-	-	565	-	-	-	510	-	-	-	477	-	-	-	450	230
200	458	623	-	-	-	565	-	-	-	510	-	-	-	477	-	-	-	450	230
250	475	623	-	-	-	565	-	-	-	510	-	-	-	477	-	-	-	450	230

Tab. 11a: Fitting length - with flanged connection

DN	Dimensions A [mm]				
	DIN, ISO	ANSI			
	- PN 40	150 RF	150 RTJ	300 RF	300 RTJ
15	130	184	197	190	200
20	150			194	207
25	160			197	210
40	200	222	235	235	248
50	230	254	267	267	283
80	310	298	311	317	333
100	350	353	366	368	384
150	480	451	464	473	489
200	600	543	556	568	584
250	730	673	686	708	724

Tab. 12: Valve weight (without drives) [kg]

DN	Valve with bonnet	
	standard	extension and bellows seal
15	6	9
20	7	10
25	7,5	11
32	9,5	13
40	11,5	16
50	14,5	20
65	20	28
80	28,5	36,5
100	42	50
150	120	135
200	180	195
250	320	335

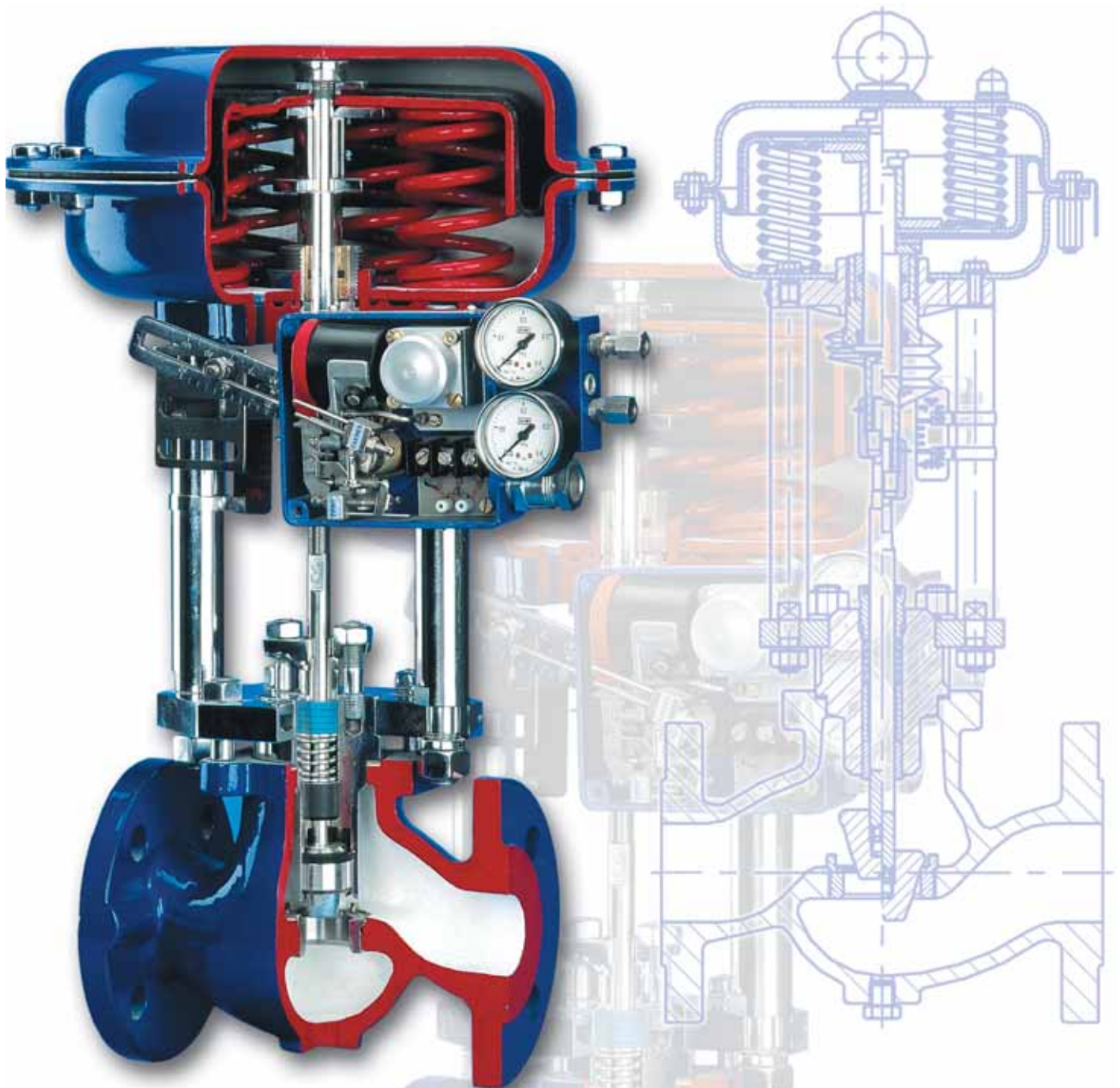
Tab. 13: Masses of actuator [kg]

Type of actuator	Weight
P/R - 250	10
P/R - N - 250	14,5
P/R - 400	16
P/R - N - 400	20,5
P/R - 630	30
P/R - N - 630	37
P/R - 1000	74
P/R - N - 1000	100

Tab. 14: Weight of manual operating mechanism [kg]

Type of actuator	Weight
NN - 250	5,5
NN - 400	6,5
NN - 630	8,5
NN - 1000	40

Our standard-control valve BR 11



Please pay attention to our special valves

- Control valves for high pressure and high temperature: **BR 12a, BR 12b**
- Three-way-control valve with mixing- and distribution service
- Rotary-globe valve for aggressive fluid and fluid with solid contents

More information to our special valves you will find it on www.pre-vent.com



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